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(Illustrated articles are marked with an asterisk.)

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SCIENTIFIC AMERICAN SUPPLEMENT

No. 807.

For the Week Ending June 20, 1891.

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THE SAILING OF TWO POLAR EXPEDITIONS.

In addition to the Greenland exploring expedition of Lieut. Peary, the sailing of which from New York was noted in our last issue, another expedition left Denmark the day following for the specific exploration of the east coast of Greenland, between 66° and 77° north latitude. The latter expedition is under the auspices of the Danish government, and is commanded by Lieut. Ryder, who intends to connect the surveys of Scoresby and the Koldewey expedition on the north with the discoveries of Capt. Holm on the south, completely outlining the east coast from Cape Farewell, its southern extremity, to Cape Bismarck in the north. Considerable difficulty is anticipated in reaching the coast where Lieut. Ryder expects to land, from the great ice fields almost constantly pressing against it. The party will consist of only five or six men, and it is designed to devote the fall season to the study of glacial phenomena, and the investigation of neighboring fiords with their glaciers. When the sledging period begins next spring, the explorer will start with sledges and boats to ascertain the outlines of the coast and study the edge of the inland ice, awaiting the arrival of a steamer to take him home about the latter part of next summer. If the vessel does not reach Ryder and his men, the party are prepared to spend the second winter in Greenland, retreating in the spring of 1893 to Cape Farewell and the Danish settlements of the west coast.

Lieut. Peary, in a communication published since his departure, gives some additional interesting details touching his plans for reaching the extreme north end of Greenland. After erecting a house on Whale Sound, near their landing, reconnoisances will be attempted across the great tongue of inland ice covering Prudhoe Land to the southern angle of Humboldt Glacier, where an advance depot for the main sledge journey will be established. In the spring the advance will be undertaken from Humboldt Glacier to the head of Peterman Fiord, where a second depot of supplies will be established, and from which point an advance party of two or three will push on with sledges, the others returning to Whale Sound. From the head of Peterman Fiord the route will be to the head of Grand Osborne Fiord, thence to the head of De Long Fiord, and thence to the northern terminus, from which it is intended to return by the same route to Whale Sound and await transportation home.

Lieut. Peary says of his expedition, "The whole theory of the project rests upon the now well established fact that the interior of south and middle Greenland is covered with an uninterrupted ice cap, and the more than probability (in my opinion) that in north Greenland the conditions are the same, and the ice cap nearly, if not quite, coextensive with the land. My personal impression is that the northern terminus of Greenland is not north of the 85° parallel of latitude, and that the inner ice cap is practically coextensive with the land, and this opinion is shared by Judge Daly and I think by most other eminent geographers." The base, near the Humboldt Glacier, is the one advocated by Kane, Hayes, Hall, and other eminent Arctic authorities, and it is expected that it will be possible to lay therefrom a straight course from point to point, without any "tidal cracks or chaos of heaped-up ice" to compel a long detour or stop further advance.

Besides Mrs. Peary, who accompanies the expedition to Whale Sound, the party will consist of Lieut. Peary and five men, as follows: John M. Verhoeff, of Louisville, Ky., aged 25, a mineralogist, and educated in an Eastern university; Dr. Frederick A. Cook, surgeon, aged 26, graduate of the College of Physicians and Surgeons and of the Univerity of the City of New York; Langdon Cook, Flushing, L. I., aged 26, member of the American Ornithologists' Union and member of the Brown-Stanton party in the Colorado Cañon survey of 1889–90; Eivind Astrüp, of Christiania, Norway, graduate of the Christiania Commercial College, an athlete, and especially skillful in ski-running; Matthew Hensen, Virginia, 23 years of age, colored. All possess first class physique, with exceptionally high lung power, and are men of diversified attainments, especially selected for the task in hand.

These two expeditions, with the auxiliary party from the Philadelphia Academy of Natural Sciences, going with Peary to Whale Sound to make scientific collections on the west coast, are almost certain to add very materially to our knowledge of Greenland, if they do not furnish any conclusive information as to the existence or non-existence of an open polar sea. The exploration of the Arctic Zone in its entirety, with its laws of aerial and oceanic currents, is a work to which it is hoped these expeditions, with their apparently moderate and practicable scope, will largely contribute.

Enforced Temperance.

The *Nation* says: "The agency of the railroad companies in promoting temperance is not generally appreciated. They employ 689,912 persons, not counting those who mine the coal and iron, make the rails or locomotives, or build the cars and carriages used by the road. The freight and passenger traffic of the country is practically controlled by 600 of these corporations, and of these 600 no fewer than 375 prohibit the use of intoxicating liquors by their employes, among the number being most of the largest companies. The Brotherhood of Locomotive Engineers uses its influence in the same direction. 'Whenever a member of the order is known to be dissipated,' says Mr. Arthur, long the head of the organization, 'we not only expel or suspend him, but notify his employers,' and during the last year 375 members were expelled for this cause. This is only one illustration of the way in which practical business considerations are operating to promote the spread of temperance. It is purely a matter of business with the railroad companies. They simply cannot afford to employ a man who is liable any day to get drunk and precipitate some terrible disaster. The average man thus comes to see that it is 'money in his pocket,' in more senses than one, if he keeps out of the saloon; and the moral is not lost upon him."

Fastest Average Time across the Atlantic.

The White Star steamship Majestic completed a voyage on June 10 that would have been the best on record from Queenstown if she had gone over the same course traversed by the City of Paris when she made her record run of 5 days 19 hours and 18 minutes. The Majestic took a long southerly course of 2,850 miles to avoid ice and fog. Her time was 5 days 22 hours and 20 minutes, and her average speed per hour was 20·023 knots. This is the best recorded hourly average ever made by an ocean steamship. Over the record course of 2,788 knots her time would have been about 5 days, 19 hours and 4 minutes, or 14 minutes better than the record of the City of Paris. The Majestic's daily runs, from noon to noon, a period of about twenty-four hours and fifty minutes, were:

	Miles.
June 4	441
June 5	501
June 6	497
June 7	501
June 8	502
June 9, to the Sandy Hook Lightship	408
Total	2,850

The Majestic brought 1,005 steerage and 395 cabin passengers.

An Explosive Mixture.

Dr. John Grant writes to the *Lancet* as follows:

Having occasion to make a disinfectant fluid to apply to an offensive surface on a body awaiting post mortem examination, I chanced to select permanganate of potash. Thinking the solution might dry too quickly and inefficiently deodorize the part, it occurred to me to add glycerine on account of its hygroscopic powers. Putting a drachm of the crystals into a three ounce bottle, I added two ounces of water and one of glycerine, and agitated the mixture. To my great surprise the cork and part of the contents were violently ejected, and the remaining portion developed great heat. Every one is familiar with the danger of mixing glycerine and nitric acid; I have not, however, seen any mention of a combination of it and permanganate of potash. I observed the mixture became brown, losing its purple color like a deoxidized solution of the salt; and as no effervescence took place, it is probable that the glycerine combined with the oxygen liberated by decomposition of the salt, and that, further, it possesses by some affinity of its own the power of producing rapid decomposition of the permanganate. Perhaps some chemist will kindly explain.

Tempering Tools.

The following is said to be the Swiss method of hardening cast steel for cutting tools. Mix in a suitable vessel four parts of pulverized resin and two parts of train oil. Stir well in this one part hot tallow. Into this mixture the article to be hardened is plunged at a low red heat and held there until thoroughly cooled. Without cleaning off, the piece is again put into the fire and suitably tempered in the ordinary way. An examination of steel thus hardened indicates that the hardening is deeper and more uniformly distributed than is commonly the case, and that the steel is less brittle. Articles thus hardened have excellent and durable cutting qualities.—*Stone.*

The Lick Observatory—A Change in the Staff.

James E. Keeler, who has been associated as an astronomer with the Lick Observatory ever since that institution was opened, will now have charge of the astronomical work at the Allegheny Observatory, where Professor Langley was stationed before his removal to Washington. He served at Allegheny under Professor Langley some years ago, and ascended Mount Whitney with that distinguished scientist in 1881. He has made spectroscopic work his specialty. Mr. Campbell, of the University of Michigan, will fulfill part of the duties performed by Mr. Keeler at the Lick Observatory.

Condensed Information Concerning Some of the More Valuable Insecticides.

KEROSENE EMULSION.

This insecticide acts by contact and is applicable to all non-masticating insects (sucking insects, such as the true bugs and especially plant lice and scale insects and also to many of the mandibulate insects when the use of arsenites is not advisable. Kerosene emulsion may be made by means of various emulsifying agents, but the most satisfactory substances and those most available to the average farmer and fruit grower are milk and soapsuds. In each of these cases the amount of emulsifying agent should be one-half the quantity of kerosene.

One of the most satisfactory formulas is as follows:

		Per cent.
Kerosene	2 gals.	67
Common soap or whale oil soap	½ lb.	33
Water	1 gal.	

Heat the solution of soap and add it boiling hot to the kerosene. Churn the mixture by means of a force pump and spray nozzle for 5 or 10 minutes. The emulsion, if perfect, forms a cream which thickens upon cooling and should adhere without oiliness to the surface of glass. For use against scale insects dilute one part of the emulsion with nine parts of water. For most other insects dilute one part of the emulsion with fifteen parts of water. For soft insects like plant lice the dilution may be carried to from 20 to 25 parts of water.

The milk emulsion is produced by the same methods as the above.

THE RESIN WASHES.

These insecticides act by contact, and also, in the case of scale insects, by forming an impervious coating which effectually smothers the insects treated. These resin washes vary in efficacy according to the insect treated. Experience has shown that the best formula for the red scale (*Aonidia aurantii* Maskell) and its yellow variety (*A. citrinus* Coquillett) is as follows:

Resin	18 lb.
Caustic soda (70 per cent strength)	5 "
Fish oil	2½ pts.
Water to make	100 gals.

The necessary ingredients are placed in a kettle and a sufficient quantity of cold water added to cover them; they are then boiled until dissolved, being occasionally stirred in the meantime, and after the materials are dissolved the boiling should be continued for about an hour, and a considerable degree of heat should be employed, so as to keep the preparation in a brisk state of ebullition, cold water being added in small quantities whenever there are indications of the preparation boiling over. Too much cold water, however, should not be added at one time, or the boiling process will be arrested and thereby delayed, but by a little practice the operator will learn how much water to add so as to keep the preparation boiling actively. Stirring the preparation is quite unnecessary during this stage of the work. When boiled sufficiently it will assimilate perfectly with water, and should then be diluted with the proper quantity of cold water, adding it slowly at first and stirring occasionally during the process. The undiluted preparation is pale yellowish in color, but by the addition of water it becomes a very dark brown. Before being sprayed on the trees it should be strained through a fine wire sieve, or through a piece of Swiss muslin, and this is usually accomplished when pouring the liquid into the spraying tank, by means of a strainer placed over the opening through which the preparation is introduced into the tank.

The preparing of this compound will be greatly accelerated if the resin and caustic soda are first pulverized before being placed in the boiler, but this is quite a difficult task to perform. Both of these substances are put up in large cakes for the wholesale trade, the resin being in wooden barrels, each barrel containing a single cake weighing about 375 pounds, while the caustic soda is put up in iron drums containing a single cake each, weighing about 800 pounds. The soda is the most difficult to dissolve, but this could doubtless be obviated by first dissolving it in cold water and then using the solution as required. This insecticide may be applied at any time during the growing season.

A stronger wash is required for the San Jose scale (*Aspidiotus perniciosus* Comstock), and the following formula gives the best results:

Resin	30 lb.
Caustic soda (70 per cent)	9 "
Fish oil	4½ pts.
Water enough to make	100 gals.

Place all the ingredients in a kettle and cover with water to a depth of 4 or 5 inches, boil briskly for about 2 hours or until the compound can be perfectly dissolved with water. When this stage is reached, the kettle should be filled up with water, care being taken not to chill the wash by adding large quantities of cold water at once. It may be thus diluted to about 40 gallons, the additional water being added from time to time as it is used.

This preparation should only be applied during winter or during the dormant period. Applied in the growing season, it will cause the loss of foliage and fruit.

In the application of both these washes a very fine spray is not essential, as the object is not simply to wet the tree, but to thoroughly coat it over with the compound, and this can be best accomplished by the use of a rather coarse spray, which can be thrown upon the tree with considerable force.

FOR SUBTERRANEAN INSECTS.

Recent experiments have shown the practical value of the resin compounds against the grape phylloxera, and they will also be applicable to the apple root louse and other underground insects. The cheapest and at the same time one of the most satisfactory compounds experimented with is the following:

Caustic soda (77 per cent)	5 lb.
Resin	40 "
Water to make	50 gals.

Dissolve the soda over fire with 4 gallons of water, add the resin, and after it is dissolved and while boiling add water, slowly, to make 50 gallons of compound. For use dilute to 500 gallons. Excavate basins about the vines 6 inches deep and about 2 feet in diameter, and apply to each vine 5 gallons. The results will be more satisfactory if the treatment is made early in the spring, so that the rain of the season will assist in disseminating the wash about the roots.

The kerosene emulsion made according to the formula given above is also applicable to certain underground insects in cases where it will not prove too expensive, as, for instance, the grape phylloxera or where white grubs are infesting a valuable lawn. It may then be used in the proportion of 1 part of the emulsion to 15 gallons of water, applied liberally to the soil, and afterward washed down at frequent intervals with large quantities of water for several days. This can be done only where there is plenty of water at hand, but will be found of great value in special cases.

In other cases bisulph de of carbon may be used for specific and local underground forms. Nests of ants, for instance, may be destroyed by pouring an ounce of this substance into several holes, covering them with a wet blanket for ten minutes and afterward exploding the vapor at the mouth of the holes with a torch. Against onion, cabbage, and radish maggots this substance may also be used, by punching a hole with a sharp stick at the base of the plant and pouring in a teaspoonful of the liquid, covering afterward with earth.

THE ARSENITES—LONDON PURPLE, PARIS GREEN, AND WHITE ARSENIC.

These poisons are of the greatest service against all mandibulate insects, as larvæ and beetles, and they furnish the most satisfactory means of controlling most leaf feeders, and the best wholesale remedy against the codling moth. Caution must be used in applying them on account of the liability of burning or scalding the foliage.

The poisons should be thoroughly mixed with water at the rate of from 1 pound to 100–250 gallons water, and applied with a force pump or hand spray nozzle. In preparing the wash it will be best to first mix the poison with a small quantity of water, making a thick batter, and then dilute the latter and add to the reservoir or spray tank, mixing the whole thoroughly. When freshly mixed, either London purple or Paris green may be applied to apple, plum, and other fruit trees, except the peach, at the rate of 1 pound to 150–200 gallons, the latter amount being recommended for the plum, which is somewhat more susceptible to scalding than the apple. White arsenic does little if any injury at the rate of 1 pound to 50 gallons of water. As shown by Mr. Gillette, however, when allowed to remain for some time (two weeks or more) in water, the white arsenic acts with wonderful energy, scalding when used at the rate of 1 pound to 100 gallons from 10 to 90 per cent of the foliage. The action of the other arsenites remains practically the same, with, perhaps, a slight increase in the case of London purple.

With the peach these poisons, when applied alone, even at the rate of 1 pound to 300 or more gallons of water, are injurious in their action, causing the loss of much of the foliage.

By the addition of a little lime to the mixture, London purple and Paris green may be safely applied, at the rate of 1 pound to 125 to 150 gallons of water, to the peach or the tenderest foliage, or in much greater strength to strong foliage, such as that of the apple or most shade trees.

Whenever, therefore, the application is made to tender foliage or when the treating with a strong mixture is desirable, lime water, milky, but not heavy enough to close the nozzle, should be added at the rate of about 2 gallons to 100 gallons of the poison.

Pure arsenic, however, should never be used with lime, as the latter greatly increases its action.

With the apple, in spraying for the codling moth, at least two applications should be made—the first on the falling of the blossoms, the apples being about the size of peas, and the second a week or ten days later; but the poison should never be applied after the fruit turns down on the stem, on account of the danger of the poison collecting and remaining permanently in the stem cavity.

For the plum curculio on the plum, cherry, peach, etc., two or three applications should be made during the latter part of May and the first half of June; in the case of most leaf feeders, spray on the first indication of their presence.

CAUTION NECESSARY IN THE USE OF THESE INSECTICIDES.

The relative susceptibility of apple, plum, and peach has just been indicated under the head of arsenical poisons, and these remarks apply equally well to the uss of the kerosene emulsions. In the case of other plants thorough experiments are still necessary, and all insecticides should be first used in comparatively high dilution. In general, it may be said that tender young foliage is more susceptible and must be carefully treated. Thin-leaved pilose plants are more readily injured, while thick-leaved, glabrous species are least affected. Annual plants, such as cabbages and other garden vegetables, are more susceptible than perennials, but in the case of root crops, such as beets, turnips, radishes and potatoes, there is not the same need of caution as to damage to foliage. Damage to foliage is not shown at once, and in case of rain following an application, another application should not be made for several days. Fruit trees should not be sprayed with arsenical poison before the blossoms fall, on account of the danger of poisoning honey bees. —*Circular U. S. Depart. Agriculture.*

Furniture Polishes.

A Red Polish.

Oil of turpentine	16 oz.
Alkanet	4 drachms.
Beeswax	4 oz.

Digest the alkanet in the oil until sufficiently colored; then scrape the beeswax fine and form a homogeneous mixture by digestion over a water bath.

For a pale polish omit the alkanet.

A White Polish.

White wax	1 lb.
Solution of potash	32 oz.

Boil to proper consistency.

Polish for Fine Carved Wood.—Take 8 oz. of linseed oil, 8 oz. of old ale, the white of an egg, 1 oz. of spirit, 1 oz. of spirits of salt. To be well shaken before using. A little is to be applied to the face of a soft linen pad and lightly rubbed for a minute or two over the article to be restored, which must afterward be polished off with an old silk handkerchief. This will keep any length of time, if well corked.

For Delicate Cabinet and Papier Mache Work.

Linseed oil	32 oz.
Spirit	8 "
Vinegar	8 "
Butter of antimony	2 "
Oil of turpentine	8 "

Shake well before using, and apply with a woolen rubber.

Oil of turpentine	16 oz.
Rectified oil of amber	16 "
Olive oil	16 "
Oil of lavender	1 "
Tincture of alkanet	4 drs.

Mix.

A cotton rubber is saturated with this polish, which is thus applied to the wood. The latter is then well rubbed with soft, dry cotton rags and wiped dry.—*Meyer Bros.' Druggist.*

How Granite Columns are Turned.

Granite for columns, balusters, round posts, and urns is now worked chiefly in lathes, which, for the heaviest work, are made large enough to handle blocks 25 feet long and 5 feet in diameter. Instead of being turned to the desired size by sharp cutting instruments, as in ordinary machines for turning wood and metal, granite is turned or ground away by the wedge-like action of rather thick steel disks, rotated by the pressure of the stone as it slowly turns in the lathe. The disks, which are six or eight inches in diameter, are set at quite an angle to the stone, and move with an automatic carriage along the lathe bed. Large lathes have four disks, two on each side, and a column may be reduced some two inches in diameter the whole length of the stone by one lateral movement of the carriages along the bed. The first lathe for turning granite cut only cylindrical or conical columns, but an improved form is so made that templets or patterns may be inserted to guide the carriages, and columns having any desired swell may be as readily turned. For fine grinding and polishing the granite is transferred to another lathe, where the only machinery used is to produce a simple turning or revolution of the stone against iron blocks carrying the necessary grinding or polishing materials.

Blocks are prepared for lathe work by being roughed out with a point, and by having holes chiseled in their squared ends for the reception of the lathe dog and centers. This principle of cutting granite by means of disks revolved by contact with the stone has been also applied to the dressing of plain surfaces, the stone worked upon being mounted upon a traveling carriage and made to pass under a series of disks mounted in a stationary upright frame.—*Census Report.*